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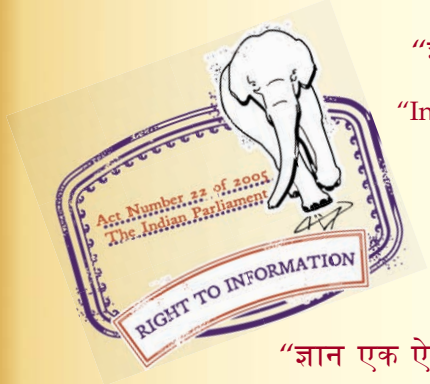

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Indian Standard

SPECIFICATION FOR SPACERS AND SPACER DAMPERS FOR TWIN HORIZONTAL BUNDLE CONDUCTORS

UDC 621·315·177 SPA

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 4 ***September*** 1982

AMENDMENT NO. 1 APRIL 1997
TO
IS 10162 : 1982 SPECIFICATION FOR SPACERS AND SPACER DAMPERS FOR TWIN HORIZONTAL BUNDLE CONDUCTORS

(*Page* 11, *clause* 5.17) — Insert the following after the first sentence:

'A 80 meter test span shall be erected at a tension equivalent to every day tension (12 % of U.T.S. of Conductor). The spacer damper shall be placed at a position between 0.825 to 0.670 times the test span from the excited end.'

(ET37)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR SPACERS AND SPACER DAMPERS FOR TWIN HORIZONTAL BUNDLE CONDUCTORS

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(*Continued on page* 2)

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Indian Standard

SPECIFICATION FOR SPACERS AND SPACER DAMPERS FOR TWIN HORIZONTAL BUNDLE CONDUCTORS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 23 April 1982, after the draft finalized by the Conductors and Accessories for Overhead Lines Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 Spacers are fitted at specified intervals on overhead transmission lines having more than one subconductor per phase for maintaining uniform spacing between the subconductors under normal operating service conditions. Spacer dampers are fitted at specified interval on overhead transmission lines having more than one subconductor per phase to perform all the functional requirements of spacer in addition to control aeolian vibration and subconductor oscillations within the permissible limits.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements and tests for spacers and spacer dampers used on overhead transmission lines with twin horizontal bundle conductors.

2. TERMINOLOGY

2.0 For the purpose of this standard the following definitions in addition to those given in IS : 1885 (Part XXXII)-1971† shall apply.

*Rules for rounding off numerical values (*revised*).

†Electrotechnical vocabulary : Part XXXII Cables, conductors and accessories for electricity supply.

2.1 Spacers — Spacers arc fitted at specified intervals on overhead transmission lines having more than one subconductor per phase for maintaining the specified spacing between the conductors of that phase under normal operating service conditions.

2.2 Spacer Dampers — Spacer dampers are fitted at specified interval on overhead transmission lines having more than one subconductor per phase to perform all the functional requirements of spacer and in addition control aeolian vibration and subconductor oscillations within the permissible limits.

2.3 Type Test — Tests carried out to prove conformity with this standard. These are intended to prove the general qualities and design of a given type of spacer/spacer damper.

2.4 Acceptance Test — Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

2.5 Routine Test — Tests carried out on all samples to check requirements which are likely to vary during production.

3. GENERAL REQUIREMENTS

3.0 The spacer and spacer damper should meet the following general requirements as may be applicable for the specific design.

3.1 Spacer/spacer damper shall have enough strength so as to restore normal spacing of the subconductors after displacement by winds, short circuits, etc, without permanent deformation or damage either to conductor or assembly itself. They shall have long life without fatigue or wear and shall have uniform and firm grip on the conductors. They shall be able to withstand all the electro-magnetic and electro-static forces under different operating conditions including dead short circuits. In addition to this spacer damper shall be capable to damp out aeolian vibrations, as well as subconductor oscillations within acceptable limits.

3.1.1 The spacer/spacer damper should be able to accommodate for relative motion between subconductors in bundle, in order to avoid damaging stresses resulting from the action of wind, icing, etc.

3.2 The materials used in manufacturing spacers/spacer dampers shall be corrosion resistant. All the ferrous parts of spacers/spacer dampers shall be hot-dip galvanized except spring washers which shall be electro-galvanized conforming to the relevant Indian Standards.

3.3 The spacer/spacer damper shall have complete ease of installation and shall be capable of removal/reinstallation without any damage.

3.4 No rubbing, other than that of the conductor clamp hinges or clamp swing bolts, shall take place between any parts of the spacer. Joint

incorporating a flexible medium shall be such that there is no relative slip between them.

3.5 Spacers/spacer dampers shall not damage or chafe the conductor in any way which might affect its mechanical strength and/or corona level. The clamp shall not damage the conductor at any time.

3.6 Any nuts used shall be locked in an approved manner against vibration loosening. The ends of bolts and nuts shall be suitably rounded/ shielded wherever necessary for better corona performance.

3.7 The spacer assembly shall have all outside surfaces smooth, and all edges and corners well rounded in a manner which shall ensure conformity with corona/RIV stipulations.

3.8 The assembly shall be flexible so as to avoid distortion or damage to the conductor or to assembly itself. Rigid spacers shall not be used except for jumpers. Rigid spacer for jumper shall meet all the requirements of spacer used on line except its performance for vibration, movements and short-circuit tests.

3.9 The electrical resistance between the conductor and components of the spacers/spacer dampers shall be reasonable to give satisfactory performance in all respects. The limit of electrical resistance shall be specified by the supplier.

3.10 The unit shall be corrosion resistant. Elastomers, if used, shall be resistant to ozone, low temperature, ultraviolet radiation and conductor temperature up to 65°C. The elastomer shall be electrically conducting and of approved standard.

3.11 The assembly shall be capable of being installed and removed from the energised line by means of hot line techniques, without completely separating the components.

3.12 Clamps with cap shall be designed to prevent its cap from slipping out of position when being tightened.

3.13 Where rubber surfaced clamp grooves are used, the rubber material shall be firmly fixed to the clamp halves. It shall be electrically conductive. It shall have adequate resistance to ozone, low temperature, ultraviolet radiation and conductor temperature up to 65°C.

In case of open elastomer clamps, helical/preformed retaining rods shall be used. Mechanical properties of retaining rods shall be as per the relevant Indian Standard. The end treatment of the rods shall suit the electrical requirements of spacer assembly.

3.13.1 The retaining rod ends shall terminate within the bundle area,

3.14 The clamp grooves shall be in contact with the conductor over the entire clamping surface, except for rounded edges. Universal type bolted clamps, covering a range of conductor sizes shall not be permitted.

3.15 The groove of the clamp body and clamp cap shall be smooth and free of projections, grit or other material which cause damage to the conductor when the clamp is installed.

4. MARKING

4.1 Suitable marking shall be made to indicate the name of the manufacturer and year of manufacture.

4.2 The spacers/spacer dampers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. TESTS

5.1 Clarification of Tests

5.1.1 *Type Tests* — The following shall constitute the type tests:

a) Visual examination *(see* 5.2);
b) Verification of dimensions (*see* 5.3);
c) Movement test (*see* 5.4);
d) Clamp slip test (*see* 5.5);
e) Resilience test (*see* 5.6);
f) Clamp bolt torque test (*see* 5.7);
g) Assembly torque test (*see* 5.8);
h) Tensile load test (*see* 5.9);
j) Compression and pull off test (*see* 5.10);
k) Vibration test (*see* 5.11**);**
m) Corona test (*see* 5.12);
n) Radio interference voltage test (*see* 5.13);
p) Short-circuit current test (*see* 5.14);

q) Magnetic power loss test (*see* 5.15);

r) Galvanizing test (*see* 5.16); and

s) Log decrement test (for spacer dampers only) (*see* 5.17).

5.1.1.1 For the purpose of type tests the manufacturer shall submit to the testing authority not less than 3 samples, together with the relevant technical data as required. The samples shall be subjected to the type **tests** given in **5.1.1**.

5.1.1.2 *Criterion for approval* — The testing authority shall issue a type approval certificate, if the samples are found to comply with the requirements of the tests. In case of failure in any test, testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to all the tests. If in the repeat tests, no failure occurs, the samples may be considered to have been passed.

5.1.1.3 Any change in design, construction, manufacturing process or material used in a spacer/spacer damper of approved type, shall be brought to the notice of the purchaser who may, at its discretion, call for fresh samples embodying these changes.

5.1.2 *Acceptance Tests* — The following shall constitute the acceptance tests:

a) Visual examination (*see* 5.2);

b) Verification of dimensions (*see* 5.3);

c) Movement test (*see* 5.4);

d) Clamp slip test (*see* 5.5);

e) Clamp bolt torque test (*see* 5.7);

f) Assembly torque test (*see* 5.8);

g) Tensile load test (*see* 5.9);

h) Compression and pull off test (*see* 5.10); and

j) Galvanizing test (*see* 5.16).

5.1.2.1 The sampling procedure and the criterion for conformity shall be subject to agreement between the purchaser and the supplier. In the absence of such an agreement, however, the sampling procedure given in Appendix A may be followed.

5.1.3 *Routine Tests* — The following shall constitute the routine tests:

a) Visual examination (*see* 5.2); and

b) Verification of dimensions (*see* 5.3).

5.2 Visual Examination — The spacers/spacer dampers assembly shall be checked visually and it shall be free from any manufacturing defects.

5.3 Verification of Dimensions — The dimensions of the fittings shall be checked against approved drawings and gauges. The dimensions shall conform to the approved drawings.

5.4 Movement Test — The spacer/spacer damper assembly shall be capable of the following movements without damaging the conductor, assuming one conductor as moving and the other fixed. The conductors shall be tensioned at every day stress.

a) Longitudinal movement parallel to the conductor ± 50 mm

b) Vertical movement in a vertical direction at right angle to the conductor ± 25 mm

c) Torsional movement/angular movement in a vertical plane parallel to the conductor ±5°

5.5 Clamp Slip Test — The spacer/spacer damper shall be installed on test span of specified bundle conductor strung at a tension equal to the every day tension (22 percent of UTS of couductor). The clamps of spacer/spacer damper shall be tightened with the specified torque. One of the clamps of the spacer/spacer damper assembly when subjected to a specified longitudinal pull, parallel to the axis of conductor, shall not slip on the conductor, that is the permanent displacement between the conductor and the clamp, measured after removal of the load, shall not exceed 1.0 mm. Similar test shall be performed on the other clamp of the assembly also.

5.5.1 Such clamp slip test shall be conducted after each of the vibration tests mentioned in **5.11, 5.11.1, 5.11.2** and **5.11.3.** Without retorquing the clamps of the assembly after the vibrations tests each clamp shall withstand a minimum longitudinal load as agreed between the manufacturer and the purchaser.

5.6 Resilience Test — This test shall be applicable only to spacer/spacer damper employing retaining rods for clamping. The spacer/spacer damper shall be installed and removed five times on the conductor. The retaining rods shall successfully withstand the above applications without loosening their slip strength and shall be able to pass clamp slip test specified in **5.5**.

5.7 Clamp Bolt Torque Test — The spacer shall be attached to conductor or a bar with diameter equal to the conductor diameter ± 0 25 mm. A torque up to 150 percent of the supplier's nominal recommended installation torque shall be applied to the clamp bolts or cap screws. These shall not cause failure or functional impairment of component parts.

5.7.1 This test is not applicable to spacers/spacer dampers provided with aluminium alloy clamp, bolts or cap screws with twin heads and spacer/spacer damper with helical/preformed retaining rods.

5.8 Assembly Torque Test — The spacer shall be installed on the conductor or a bar with diameter equal to the conductor diameter ± 0.25 mm. The sample shall not rotate on either clamp with respect to the conductor on applying a torque of 4·0 kg-m either in clockwise or anti-clockwise direction.

5.9 Tensile Load Test — The spacer/spacer damper shall be installed on the conductor bundle having everyday tension. By a suitable arrangement with a load recording device, both the conductors shall be pulled, to attain the specified tensile load (750 kg for 40 kA fault level). The distance between the pulling rings of each pair shall not exceed the subconductor spacing.

5.10 Compression and Pull off Test — The spacer/spacer damper shall be installed on the conductor bundle having everyday tension. By a suitable arrangement with a load recording device, both the conductors shall be compressed, to attain the specified compressive load (1500 kg for 40 kA fault current). The distance between the rings pair shall not exceed the subconductor spacing.

5.11 Vibration Test — The spacer/spacer damper assembly shall be clamped to conductor that are strung as per the bundle configuration. During the vibration tests the axis of each spacer clamp shall be maintained parallel to its initial static position by applying maximum working tension on at least one conductor. Where fixed clamps are used there shall be no more than 100 mm of conductor between the spacer clamps and adjacent fixed clamps for longitudinal displacement test and not more than 200 mm of conductor for vertical vibration test. The test specimen shall be free to vibrate for these tests and shall not be retorqued or adjusted between the tests.

5.11.1 *Longitudinal Vibration Test* — The stationary conductors shall be restrained either by fixed clamps or by tension and the vibrating conductor which may be a rigid bar of diameter equivalent to that of the conductor shall be restrained by fixed clamps. The displacement of the conductor shall be 25 mm on either side. The longitudinal movement shall be parallel to the conductors at not less than two cycles per second for one million cycles.

5.11.2 *Vertical Vibration Test* — The spacer/spacer damper shall be vibrated vertically from 5 to 40 Hz to determine the resonant frequencies. If resonant frequencies are observed in the spacer, the vertical vibration test shall be conducted at the highest resonant frequency. If no resonant

5.3 Verification of Dimensions — The dimensions of the fittings shall be checked against approved drawings and gauges. The dimensions shall conform to the approved drawings.

5.4 Movement Test — The spacer/spacer damper assembly shall be capable of the following movements without damaging the conductor, assuming one conductor as moving and the other fixed. The conductors shall be tensioned at every day stress.

a) Longitudinal movement parallel to the conductor ± 50 mm

b) Vertical movement in a vertical direction at right angle to the conductor ± 25 mm

c) Torsional movement/angular movement in a vertical plane parallel to the conductor ±5°

5.5 Clamp Slip Test — The spacer/spacer damper shall be installed on test span of specified bundle conductor strung at a tension equal to the every day tension (22 percent of UTS of couductor). The clamps of spacer/spacer damper shall be tightened with the specified torque. One of the clamps of the spacer/spacer damper assembly when subjected to a specified longitudinal pull, parallel to the axis of conductor, shall not slip on the conductor, that is the permanent displacement between the conductor and the clamp, measured after removal of the load, shall not exceed 1.0 mm. Similar test shall be performed on the other clamp of the assembly also.

5.5.1 Such clamp slip test shall be conducted after each of the vibration tests mentioned in **5.11, 5.11.1, 5.11.2** and **5.11.3.** Without retorquing the clamps of the assembly after the vibrations tests each clamp shall withstand a minimum longitudinal load as agreed between the manufacturer and the purchaser.

5.6 Resilience Test — This test shall be applicable only to spacer/spacer damper employing retaining rods for clamping. The spacer/spacer damper shall be installed and removed five times on the conductor. The retaining rods shall successfully withstand the above applications without loosening their slip strength and shall be able to pass clamp slip **test** specified in 5.5.

5*7 Clamp Bolt Torque Test — The spacer shall be attached to conductor or a bar with diameter equal to the conductor diameter ± 0 25 mm. A torque up to 150 percent of the supplier's nominal recommended installation torque shall be applied to the clamp bolts or cap screws. These shall not cause failure or functional Impairment of component parts.

5.7.1 This test is not applicable to spacers/spacer dampers provided with aluminium alloy clamp, bolts or cap screws with twin heads and spacer/spacer damper with helical/preformed retaining rods.

5.8 Assembly Torque Test — The spacer shall be installed on the conductor or a bar with diameter equal to the conductor diameter ± 0.25 mm. The sample shall not rotate on either clamp with respect to the conductor on applying a torque of 4·0 kg-m either in clockwise or anti-clockwise direction.

5.9 Tensile Load Test — The spacer/spacer damper shall be installed on the conductor bundle having everyday tension. By a suitable arrangement with a load recording device, both the conductors shall be pulled, to attain the specified tensile load (750 kg for 40 kA fault level). The distance between the pulling rings of each pair shall not exceed the subconductor spacing.

5.10 Compression and Pull off Test — The spacer/spacer damper shall be installed on the conductor bundle having everyday tension. By a suitable arrangement with a load recording device, both the conductors shall be compressed, to attain the specified compressive load (1 500 kg for 40 kA fault current). The distance between the rings pair shall not exceed the subconductor spacing.

5.11 Vibration Test — The spacer/spacer damper assembly shall be clamped to conductor that are strung as per the bundle configuration. During the vibration tests the axis of each spacer clamp shall be maintained parallel to its initial static position by applying maximum working tension on at least one conductor. Where fixed clamps are used there shall be no more than 100 mm of conductor between the spacer clamps and adjacent fixed clamps for longitudinal displacement test and not more than 200 mm of conductor for vertical vibration test. The test specimen shall be free to vibrate for these tests and shall not be retorqued or adjusted between the tests.

5.11.1 *Longitudinal Vibration Test* — The stationary conductors shall be restrained either by fixed clamps or by tension and the vibrating conductor which may be a rigid bar of diameter equivalent to that of the conductor shall be restrained by fixed clamps. The displacement of the conductor shall be 25 mm on either side. The longitudinal movement **shall** be parallel to the conductors at not less than two cycles per second **for** one million cycles.

5.11.2 *Vertical Vibration Test* — The spacer/spacer damper shall be vibrated vertically from 5 to 40 Hz to determine the resonant frequencies. If resonant frequencies are observed in the spacer, the vertical vibration **test** shall be conducted at the highest resonant frequency. If no resonant

frequency is observed, the test shall be conducted over the frequency range from 20 to 30 Hz at double amplitude of 4 mm for 10 million cycles.

5.11.3 *Sub-Span Oscillation Test* (*To be conducted on the specimen used for vibration test*) — An 80-metre test span shall be erected at a tension equivalent to everyday tension of a span of 400 metres (22 percent of UTS of conductor) and the spacer/spacer damper shall be clamped to the subconductors at a suitable point. The sub-span shall then be oscillated by means of a shaker forming single loop between the shaker and spacer, the distance between the shaker and spacer being about 20 metres. The amplitude of oscillation in the middle of loop (antinode position) shall be kept arithmatic equivalent of an amplitude of 150 mm for a full sub-span of 80 metres. The test shall be carried out at a frequency of 3 Hz or higher for at least one million cycles. After the test, the sample and the conductors shall be checked for any damage or functional impairment of any component part.

5.12 Corona Test — The spacer/spacer damper shall be installed on a bar of equivalent conductor diameter ± 0·25 mm, arranged in the same manner as the conductor configuration. The sample shall then be subjected to a power frequency test voltage, phase to earth voltage simulating the maximum surface gradient as obtained on the line as per the values given in IS : 731-1971* or as agreed between the manufacturer and the purchaser. There shall be no evidence of corona on any point of the sample at the said voltage.

Corresponding corona inception voltage shall also be recorded.

5.13 Radio Interference Voltage Test — The test shall be conducted as per IS : 8263-1976† and RIV recorded at voltages mentioned in **5.11.** The maximum value of RIV shall be as agreed between the manufacturer and the purchaser.

5.14 Short Circuit Current Test

5.14.1 The spacers/spacer dampers shall be installed at the recommended intervals simulating a normal sub-span on the central spacer/spacer damper which shall be the test specimen, in a suitable test span consisting of a horizontal twin bundle with 450 mm subconductor spacing strung at a tension equivalent to everyday tension for a span of 400 metres (**22** percent of UTS of conductor). A fault current equal to the short circuit current rating asymmetrical with 1·6 offset shall be applied to the

*Specification for porcelain insulators for overhead power lines with a nominal voltage greater than 1 000 V (*second revision*).

†Method for radio interference tests on high-voltage insulators.

conductors for a minimum duration of 5 cycles for 5 successive times. **The** spacer/spacer damper, under test, shall withstand the above test without slipping on the conductor, loosening for failure of its component parts.

5.14.2 Alternatively an equivalent compression and tension test may be conducted (not applicable to spring type spacers) according to the test method given in **5.9** and **5.10.**

5.15 Magnetic Power Loss Test — The spacer/spacer damper assembly, involving ferrous parts shall be tested in a manner to simulate service conditions, for a 50 Hz sine wave ac current. The difference between power loss (*see* Note) without and with spacer/spacer damper assembly at a constant room temperature shall be within the limit as agreed between the manufacturer and the purchaser at the specified current. The loss shall be determined by averaging a group of at least four spacers/spacer dampers assemblies.

NOTE — In case of spacers/spacer dampers suitable 400 kV system with **a** sub-conductor spacing of 450 mm Joss shall be within 1 watt at 600 amperes current.

5.16 Galvanizing Test — This test, if applicable to any components, shall be carried out in accordance with IS : 2633-1972*.

5.17 Log Decrement Test — This test is applicable to the spacer dampers only. The test span shall be instrumented to continuously monitor and record the horizontal motion of the subconductor in the sub-span between suspension point and the first spacer damper.

The decrement test shall be made with an initial peak to peak amplitude of four to six conductor diameters in the middle of the sub-span being mentioned. The conductor shall be excited in a horizontal one loop per sub-span resonant mode with a slow and steady built up of amplitude that minimises harmonics and other distortions.

After achieving a steady state motion, the conductor excitation shall be discontinued leaving the conductor undisturbed. The motion shall be recorded until it reduces to an amplitude of half the conductor diameter.

The logrithmic (log) decrement shall be the value for a minimum reduction of 80 percent of amplitude. The minimum acceptable log decrement average for five or more excitation shall be 0·040 based upon **the** following formula for decay:

$$\delta = \log_e \frac{An}{An+1} = \frac{1}{n} \log_e \frac{Ao}{An}$$

where

Ao is the initial amplitude, and

An is the amplitude *n* cycles later.

*Methods of testing uniformity of coating on zinc coated articles *(first revision)*.

APPENDIX A

(*Clause* 5.1.2.1)

SAMPLING PROCEDURE FOR SPACERS AND SPACER DAMPERS

A-1. SCALE OF SAMPLING

A-1.1 Lot — In a consignment, all the spacers and spacer dampers manufactured from the same material in the same factory under similar conditions of production shall be grouped together to constitute a lot.

A-1.2 The number of spacers/spacer dampers to be selected from each lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 1.

TABLE 1 SAMPLE SIZE AND ACCEPTANCE NUMBER

LOT SIZE	FOR VISUAL EXAMINATION AND DIMENSIONAL REQUIREMENTS		FOR ALL OTHER ACCEPTANCE TESTS
	Sample Size	Acceptance Number	Sample Size
(1)	(2)	(3)	(4)
Up to 1 000	30	1	5
1 001 „ 3 000	50	2	8
3 001 ,, 5 000	80	3	10
Above 5 000	100	4	15

A-1.2.1 These spacers shall be selected from the lot at random. In order to ensure the randomness of selection, procedure given in IS : 4905-1968* may be followed.

A-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMATION

A-2.1 The spacers/spacer dampers selected at random according to col 1 and 2 of Table 1, shall be subjected to visual examination and dimensional requirement tests. A sample failing to satisfy any of these requirements shall be termed as defective. A lot shall be considered as conforming to these requirements if number of defectives found in the sample is less than or equal to corresponding acceptance number given in col 3 of Table 1, otherwise the lot shall be rejected without further testing.

*Methods for random sampling.

A-2.2 The lot which has been found as conforming to the above requirements shall then be tested for the remaining acceptance tests. For this purpose the sample size shall be as given in col 4. For the purpose of acceptance of lot all the samples selected in col 4 shall pass the tests.

A-2.2.1 In the case of a failure of a sample, however, double the number of samples selected in col 4 of Table 1 may be taken and subjected to the tests in which failure occurred. If no failure occurs during the retesting the lot shall be deemed to have passed the tests.

A-2.3 The lot shall be considered as conforming to the requirements of acceptance **tests** if **A-2.1 and A-2.2** or **A-2.2.1** are satisfied.

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